



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,757	08/28/2001	Yi Wei	CR00-046	5781
23330	7590	05/13/2004	EXAMINER	
MOTOROLA, INC. CORPORATE LAW DEPARTMENT - #56-238 3102 NORTH 56TH STREET PHOENIX, AZ 85018			TRINH, MINH N	
			ART UNIT	PAPER NUMBER
			3729	

DATE MAILED: 05/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/940,757

Applicant(s)

WEI ET AL.

Examiner

Minh Trinh

Art Unit

3729

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 7-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claim 1 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Xu et al (US 5,973,444). Xu et al disclose a method of forming a vacuum microelectronic device comprising: forming at least one electron emitter a substrate (see related Figs 3D-9D, which shows a substrate and at least one electron emitter associated therefrom, and the discussion at col. 22, lines 15-18); applying a first electric field to move a portion of the at least one electron emitter in a direction toward the first electric field (as discussed at col. 14, lines 66-67). Xu et al do not particular teach a step of maintaining the at least one electron emitter in the direction toward the electric field after removing the first electric field. However, regarding the discussion above. It would have been an obvious matter of design choice to maintain a number of electron emitter in the direction toward the electric field after removing the first electric field since applicant has not disclosed that this particular step is critical, patentably distinguishing features and it appears that the invention would perform equally well with the teaching of electron emitter and its associated with the controlling the application of electric field to the electrode structure as disclosed by the prior art reference (as discussed by Xu et al, col. 22, lines 44-45).
3. Claim 1 is also rejected under 35 U.S.C. 103 (a) as being unpatentable over Bower et al (US 6,630,772). Bower et al disclose a method of forming a vacuum microelectronic device comprising: forming at least one electron emitter a substrate (see

Art Unit: 3729

related Fig. 3, which shows a substrate and at least one electron emitter associated therefrom); applying a first electric field to move a portion of the at least one electron emitter in a direction toward the first electric field (as discussed at col. 8, lines 40-50). Bower et al is in silent of maintaining the at least one electron emitter in the direction toward the electric field after removing the first electric field. However, it would have been an obvious matter of design choice to maintain a number of electron emitter in the direction toward the electric field after removing the first electric field since applicant has not disclosed that this particular step is critical, patentably distinguishing features and it appears that the invention would perform equally well with the teaching of electron emitter and its associated with the controlling the application of electric field to the electrode structure as disclosed by the prior art reference (see the discussion of Bower et al , at col. 8, lines 66-67).

4. Claims 3-5 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Xu et al or Bower et al.

As applied to each of claim 3-5, Xu et al or Bower et al as modified and relied upon above do not teach the following: "using a second electric field having a value that is less than the value of the first electric field" (as recited in claim 3); and the configuration between the second and the first electric field (as recited in claims 4-5). It would have been an obvious matter of design choice to choose any desired value for the first electric field and the second electric field since applicant has not disclosed that the claimed "a second electric field having a value that is less than the value of the first

Art Unit: 3729

electric field" (as recited in claim 3); and the configuration between the second and the first electric field (as recited in claims 4-5) would solve any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the associated electric field configurations as taught by the applied prior art references.

Limitations of claims 4 and 5 are also met as discussed above.

5. Claims 2 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al or Bower et al as applied above and further in view of Goren et al (US 6,297,592).

As applied to claims 2 and 6, Xu et al or Bower et al, as discussed above do not teach the following steps: applying the first electric field having a value of at least 0.2 – 50 V/mA, extracting a current from the at least one electron emitter wherein the electron emitter has an internal current density of at least $1 \times 10^4 \text{ A/cm}^2$ (as recited in claim 2); forming at least one nanotube emitter on the substrate (as recited in claim 6).

Goren et al teach the features as described above, such as applying the first electric field having a value in range of 0.2 – 50 V/ μA (see Fig. 6, and the discussion at col. 4, lines 54-67, and col. 10, lines 8-11), and extracting a current from the at least one electron emitter wherein the electron emitter has an internal current density of about $1 \times 10^4 \text{ A/cm}^2$ (see the discussion in col. 4, lines 59-61), forming a nanotube on the substrate (see col. 4, line 45). Therefore, it would have been obvious to one ordinary skill in the art, at the time of the invention to employ the Goren's teaching as described above onto the invention of Xu et al or Bower et al in order to obtain a desired device

Art Unit: 3729

which meets manufacturing requirements. The motivation for this combination can be found in col. 4, lines 48-50 of Goren et al).

Response to Arguments

6. Applicant's arguments with respect to rejected claims 1-6 have been considered but are moot in view of the new ground(s) of non-final rejection.

Prior Art References

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Prior art references are cited for their teaching of method of manufacturing vacuum electron devices.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh Trinh whose telephone number is (703) 305-2887. The examiner can normally be reached on Monday -Thursday 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on (703) 308-1789. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-7307 for regular communications and (703) 305-3579 for After Final communications.

Art Unit: 3729

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1148.

A handwritten signature in black ink, appearing to read 'M. Trinh', followed by a horizontal line.

M. Trinh
Patent Examiner Group 3729

mt
May 10, 2004